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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:)
STEPHEN B. MEMORY et al)
Serial No. 10/020,782)
Filed December 12, 2001)
SPLIT FIN FOR A HEAT EXCHANGER
Group Art Unit 3743
Examiner Tho V. Duong

TRANSMITTAL OF APPELLANTS' BRIEF ON APPEAL

Mail Stop Appeal Briefs-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Enclosed herewith are the following:

- (1) Brief on Appeal (including an Appendix of Claims) in regard to the above-referenced patent application; and
- (2) A check in the amount of \$500.00 to cover the fee set forth in 37 CFR §1.17(c).

37 CFR 1.8
CERTIFICATE OF MAILING


I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Briefs-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on July 11, 2005.

Signature: Karen Sanderson
Name: Karen Sanderson

If any additional fees are required, they should be charged to our Deposit
Account No. 23-0785.

Respectfully submitted,

WOOD, PHILLIPS, KATZ,
CLARK & MORTIMER

By 
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STEPHEN B. MEMORY et al) SPLIT FIN FOR A HEAT EXCHANGER
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APPELLANTS' BRIEF ON APPEAL

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REAL PARTY IN INTEREST

The real party in interest is Modine Manufacturing Company.

37 CFR 1.8
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Signature: Karen Sanderson

Name: Karen Sanderson

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RELATED APPEALS AND INTERFERENCES

A notice of Appeal has been filed in Application Serial No. 10/013,018, filed November 30, 2001 to Stephen Memory et al and entitled "Heat Exchanger for Providing Supercritical Cooling of a Working Fluid in a Transcritical Cooling Cycle".

STATUS OF CLAIMS

Claims 8, 13-20 and 23-35 are pending. Claims 8, 13, 20 and 23 have been rejected. Claims 1-3, 9-12, 21 and 22 have been cancelled. Claims 14-19 and 24-35 are withdrawn. Rejected claims 8, 13, 20 and 23 are appealed.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The subject matter of each of independent claims 8 and 23 is a heat exchanger having a front (28) and a back (30), a plurality of spaced rows of tubes (20) from front (28) to back (30) and defining aligned tube runs (22,24,26) in each row, and fins (42) abutted to adjacent tube runs in each row and extending from front (28) to back (30) so that each fin (42) is common to each of said rows and having heat flow interrupters (56,58) in each fin at a location in the space between the aligned tube runs (22,24,26) in each row. (Specification page 7, line 10 through page 9, line 25; Figs. 1 and 2). An improvement is claimed wherein each of the heat flow interrupters (56,58) is defined by a slit (62)

extending completely through the fin (42) and is characterized by the absence of the removal of any material of which the fin (42) is made at the slit (62), with the aligned ones of the tube runs (22,24,26) being in hydraulic series. (Specification page 7, line 10 through page 10, line 4; Figs. 1 and 2).

Claim 8 further characterizes the tubes as being flattened tubes (20) and the fins (42) as being serpentine fins. (Specification page 7, line 10; page 8, line 20; Fig. 2).

The subject matter of independent claim 3 is a refrigeration system containing a transcritical refrigerant, a compressor (86) for compressing the refrigerant, an evaporator (80,82) connected to an inlet of the compressor and for evaporating the refrigerant, and a gas cooler (80,82) for receiving compressed refrigerant from the compressor (86), cooling the same and discharging the cooled refrigerant to the evaporator (80,82). (Specification page 6, lines 1-10; page 8, lines 6-8; page 12, line 5 - page 13, line 15; Fig. 7). An improvement is claimed wherein the gas cooler includes a heat exchanger having a front (28) and a back (30), a plurality of spaced rows of flattened tubes (20) from front (28) to back (30) receiving the refrigerant and defining aligned tube runs (22,24,26) in each row, and serpentine fins (42) abutted to adjacent tube runs in each row and extending from front (28) to back (30) so that each fin (42) common to each of the rows and having heat flow interrupters (56,58) in each fin (42) at a location in the space between the aligned tube runs (22,24,26) in each row. (Specification page 7, line 10 through page 9, line 25; Figs. 1 and 2). A further improvement is claimed wherein each of the flow interrupters (56,58) is defined by a

slit (62) extending completely through the fin (42) and characterized by the absence of the removal of any material of which the fin (42) is made at the slit (62).

GROUND OF REJECTION

Claims 8, 13, 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshino et al (5,531,268) in view of Martins et al (6,502,305).

Claims 8, 13, 20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoshino et al (5,531,268) in view of Stoyoff et al (US 2003/0075307).

ARGUMENT

- I. Claims 8, 13, 20 and 23 are Rejected Under 35
U.S.C. 103(a) as Being Unpatentable Over Hoshino
et al (5,531,268) in View of Martins et al (6,502,305)

Claims 8, 13, 20 and 23

The Examiner has failed to establish a *prima facie* case of obviousness as required under MPEP §§2142, 2143 *et. seq.* Specifically, for each of the reasons outlined below, the rejection relies on an improper rationale for combining the references.

The final rejections assert that Hoshino et al discloses all the claim limitations except fins that are common to each of the rows and have a slit without removal of any material from the fin, and relies on Martins et al to overcome the admitted shortcomings of Hoshino et al by asserting that it would be obvious for one of ordinary skill to employ in Hoshino et al the continuous fins of Martins et al for the purpose of simplifying the manufacture, make the heat exchanger more compact, and minimizing the heat transfer as recognized by Martins et al (Office Action dated 02-10-05, page 6). However, this assertion is completely contrary to the express teachings of Hoshino et al, which teaches directly away from utilizing a single fin, such as disclosed in Martins et al (or in Stoyloff et al).

Specifically, Hoshino et al is directed towards a folded tube heat exchanger that can be assembled flat (i.e., with all of the tubes "un-folded") and then be folded as an assembled unit which results in the simultaneous bending of all of the tubes of the disclosed heat exchanger core. The ability to simultaneously bend all of the tubes is expressly identified in Hoshino et al as an assembly benefit which results in higher productivity. See Hoshino et al, column 6, lines 37-39 stating that "A higher productivity

is realized herein, because the flat heat exchanging tubes 1 are bent all at once after the necessary parts are assembled.” See *also* Hoshino et al, column 2, lines 44-64 and column 7, line 60 - column 8, line 14, stating further benefits associated with simultaneous bending. Indeed, the simultaneous bending of all of the tubes, particularly in combination with the use of so-called reinforcing strips 13 and 14 appear to be a primary focus of Hoshino et al.

The simultaneous bending discussed above is the focus of every embodiment of Hoshino et al and cannot be accomplished in the modification proposed by the Examiner because the desired simultaneous bending taught by Hoshino et al is fundamentally incompatible with fins (such as disclosed in Martins et al) that extend across both of the parallel legs 2,3 of Hoshino et al. There is absolutely no rationale presented in the rejections, or any evidence cited in the references to support a conclusion that it would be desirable to sacrifice the expressly identified benefits associated with the simultaneous bending of the tubes of Hoshino et al so as to achieve some other benefit, such as the handling each fin once rather than twice. Absent such a rationale and supporting evidence, the rejection fails to establish a *prima facie* case of obviousness under §103 and is improper. See MPEP §§2142 and 2143 *et. seq.* and the cases cited therein. Indeed, it is hard to imagine a rationale that would allow a proposed modification where the primary reference teaches directly away from the proposed modification. See MPEP 2145 X. D. 2. stating that “References Cannot Be Combined Where References Teach Away From Their Combination”. See *also* MPEP 2141.02 stating that “PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY

FROM THE CLAIMS” and that “[a] prior reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” citing *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

The situation presented in this case is very similar to that discussed in *In re Epple*, 477 F.2d 582 (CCPA 1973), wherein the Court overruled a decision by the Board of Appeals based on the Court’s determination that the modification proposed to the device of a prior art reference was contrary to the technique of manufacture disclosed in the prior art reference for making the claimed device. See *In re Epple*, 586 (stating that “We too think that one possessed of ordinary skill in the art would not have envisioned the claimed structure from Pomerantz & Heiman, especially in light of the technique of manufacture disclosed by Pomerantz which differs completely from the method of making the claimed device”). In this case, as in *In re Epple*, the rejections attempt to modify a primary reference contrary to its disclosed technique of manufacture.

Furthermore, beyond the express teaching away of Hoshino et al, the use of common fins such as taught by Martins et al (or Stoyloff et al) that extend across both of the parallel legs 2,3 of Hoshino et al would require greater accuracy in the individual bending of each of the tubes and in the entire construction of the heat exchanger because the parallel legs 2,3 of each tube 1 of Hoshino et al must lie strictly in the same plane in the assembled state so as to accommodate a fin that would extend across both parallel legs 2,3; something which is not currently required in the construction of Hoshino et al and can only be viewed as a complication in the assembly, rather than an improvement. This

complication is not overcome by the asserted advantage of “making the heat exchanger more compact” (explained by the Examiner at page 8 of the Office Action dated 8-24-04 as meaning that “the number of separated parts for forming a heat exchanger is significantly reduced by using one common fin”). This is so because the proposed modification would more than double the number of bending operations, as each of the tubes must be individually bent according to the proposed modification, rather than simultaneously bent in the single operation of the unmodified Hoshino et al construction, and because of the increased accuracy required for each of the individually bent tubes of the proposed modification. Thus, beyond the express teaching away of Hoshino et al, there is at least one additional reason why one skilled in the art would not pursue the proposed modification. Accordingly, the motivation “to simplify the manufacture” would lead one skilled in the art to maintain the current construction of Hoshino et al, rather than to pursue the modification proposed in the rejections.

Furthermore, even if it could somehow be shown that the modification proposed by the Examiner would desirably “simplify manufacture”, it would have to further be shown that the associated benefit would somehow outweigh the penalty (admitted by the Examiner at page 7 of the Office Action dated 8-24-04) in minimizing heat conduction that would result from the proposed modification.

Specifically, the proposed modification using a common fin would result in greater heat conduction in comparison to the separate fins 11 and 12 already disclosed for use in Hoshino et al and, accordingly, the motivation of “minimizing heat conduction” used for the proposed modification is not only unsupportable, but actually teaches directly against the

proposed modification. Indeed, one skilled in the art concerned with minimizing heat conduction would retain the structure disclosed in Hoshino et al rather than substitute any of the fins that extend across both the parallel legs 2 and 3 of Hoshino et al as proposed in the rejections. At page 7 of the Office Action dated August 24, 2004, the Examiner expressly agreed with this rationale and stated that “the examiner agrees with the Applicant in an aspect of the thermal conduction, separated fins would result less thermal conduction than Martins or Stoyhoff’s fins.” However, the Examiner then appears to assert that the motivation of “minimizing heat conduction” only comes into play after one skilled in the art has already been motivated to modify Hoshino et al by adding a common fin, such as taught by Martins et al (or Stoyhoff et al), but this argument ignores that one skilled in the art would not so substitute a fin because Hoshino et al teaches directly away from making such a modification. Furthermore, even if one were so motivated, one would be dissuaded from making the proposed modification because of the penalties in heat conduction associated with using a common fin that extends from one parallel leg to the next. See MPEP §2141.02 stating that “PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS”. In this case, one skilled in the art clearly would not make the proposed modification because the important motivation of “minimizing heat conduction”, as originally asserted by the Examiner, teaches against the modification proposed by the Examiner.

In summary, during the course of the prosecution, the Examiner has identified two motivations, minimizing heat conduction and simplifying manufacture (which is believed to include the assertion that it makes the heat exchanger more compact, i.e., reduces part

count), neither of which support the proposed modification and both of which teach away from the proposed modification. Accordingly, for each of the above reasons taken alone or together, the rejection is improper and should be withdrawn.

II. Claims 8, 13, 20 and 23 Are Rejected Under
35 U.S.C. 103(a) as Being Unpatentable Over
Hoshino et al (5,531,268) in View of Stoyhoff et al

Claims 8, 13, 20 and 23

The Examiner has failed to establish a *prima facie* case of obviousness as required under MPEP §§2142, 2143 *et. seq.* Specifically, the rejection relies on improper rationales for combining the references.

The final rejection asserts that Hoshino et al lacks a plurality of tabs connecting the fin elements, and, as with the rejection based on Hoshino et al in view of Martins et al, relies on Stoyhoff et al to overcome the admitted shortcomings of Hoshino et al by asserting that it would be obvious for one of ordinary skill to employ in Hoshino et al the fins of Stoyhoff et al for the purpose of minimizing heat conduction and facilitating assembly. (Office Action dated 2-10-05, page 5).

Because the rationale and proposed modification for the rejection based on Hoshino in view of Stoyhoff et al is essentially the same as the rejection based on Hoshino et al in view of Martins et al, and is improper for the same reasons, the arguments presented by Applicants in Part I. of this Brief's Argument section apply equally well to the proposed modification based on the fins of Stoyhoff as they did to the proposed modification based on the fins of Martins et al. Accordingly, for the purposes of brevity, the arguments

presented in Part I. of the Argument section of this brief are incorporated herein by reference and applied to the proposed modification with the fins of Stoyhoff et al.

In summary, as with the rejection based on Hoshino et al in view of Martins et al, during the course of the prosecution, the Examiner has identified two motivations (minimizing heat conduction and facilitating assembly), neither of which support the proposed modification and both of which teach away from the proposed modification.

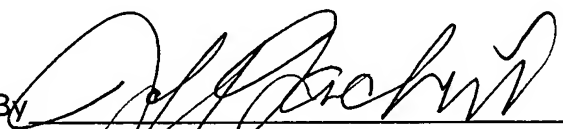
Accordingly, in view of the foregoing, the rejection should be withdrawn.

CONCLUSION

In view of the foregoing, Applicants respectfully request withdrawal of the rejections of claims 8, 13, 20 and 23 and allowance of the case.

Respectfully submitted,

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APPENDIX OF CLAIMS

8. In a heat exchanger having a front and a back, a plurality of spaced rows of flattened tubes from front to back and defining aligned tube runs in each row, and serpentine fins abutted to adjacent tube runs in each row and extending from front to back so that each fin is common to each of said rows and having heat flow interrupters in each fin at a location in the space between the aligned tube runs in each row, the improvement wherein each said heat flow interrupter is defined by a slit extending completely through the fin and is characterized by the absence of the removal of any material of which the fin is made at the slit, the aligned ones of said tube runs being connected in hydraulic series.

13. In a refrigeration system containing a transcritical refrigerant, a compressor for compressing the refrigerant, an evaporator connected to an inlet of the compressor and for evaporating the refrigerant, and a gas cooler for receiving compressed refrigerant from the compressor, cooling the same and discharging the cooled refrigerant to the evaporator, the improvement wherein the gas cooler comprises a heat exchanger having a front and a back, a plurality of spaced rows of flattened tubes from front to back receiving said refrigerant and defining aligned tube runs in each row, and serpentine fins abutted to adjacent tube runs in each row and extending from front to back so that each fin is common to each of said rows and having heat flow interrupters in each fin at a location in the space between the aligned

tube runs in each row, the improvement wherein each said heat flow interrupter is defined by a slit extending completely through the fin and is characterized by the absence of the removal of any material of which the fin is made at the slit.

20. The refrigeration system of claim 13 wherein said system is a heat pump system wherein said evaporator is also a gas cooler and said gas cooler is also an evaporator.

23. In a heat exchanger having a front and a back, a plurality of spaced rows of tubes from front to back and defining aligned tube runs in each row, and fins abutted to adjacent tube runs in each row and extending from front to back so that each fin is common to each of said rows and having heat flow interrupters in each fin at a location in the space between the aligned tube runs in each row, the improvement wherein each said heat flow interrupter is defined by a slit extending completely through the fin and is characterized by the absence of the removal of any material of which the fin is made at the slit, the aligned ones of said tube runs being connected in hydraulic series.



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EVIDENCE APPENDIX

There is no evidence that has been entered by the Examiner and relied upon by Appellant.



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RELATED PROCEEDING APPENDIX

There have been no decisions by a Court or the Board in any proceeding identified pursuant to (c)(1)(ii) of 37 C.F.R. §41.37.